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## NOTES

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### WOMEN IN MANUFACTURES: A CRITICISM

In her very interesting study of "The Industrial Employment of Women in the United States," Miss Edith Abbott makes some striking assertions in regard to the tendency of this important phenomenon. These assertions, based upon a wealth of statistical material, are so different from the commonly accepted views of the subject that Miss Edith Abbott is certainly to be congratulated, if she has actually succeeded in establishing new and important economic generalizations. But before the statistical fraternity will accept these generalizations, a careful verification of the data would seem to be necessary.

It has been the accepted maxim with all who have studied the industrial development of this country that the proportion of women in American industries is increasing. Not only census figures, but many direct statements in the census reports, may be quoted to that effect. The statistics of occupations has shown that the proportion of women "employed in manufacturing and mechanical pursuits" has increased from 13.0 per cent. in 1870 to 16.6 per cent. in 1880, to 18.1 per cent. in 1890, and to 18.5 per cent. in 1900. But, says Miss Abbott, this census statement is misleading, since it relates to changes only during the last thirty years, from 1870 to 1900. The statement is further made that "this increase has been far from enabling the women to recover the ground lost between 1850 and 1870, and the long-time point of view would have disclosed a tendency exactly the reverse of that indicated by the census."

The data for this striking conclusion are all to be found in the table given on page 488. It is to be very much regretted that, in an article containing about 150 references to a wealth of authorities, only this, the most important table, is left without any indications as to its exact sources. The table is entitled as follows: "Table Showing the Relative Number of Women and Men Employed in Manufacturing and Mechanical Pursuits from 1850 to 1900." I confess, it was this title that made me suspicious in regard to the accuracy of the data. For I remember that the accurate occupation

statistics of the censuses did not go back of 1870; the author of the report on *Occupations at the Twelfth Census* makes the authoritative statement that the return of occupations in 1850 did not apply to females; in 1860, while both sexes were included, the report contains the number of persons in each occupation "without distinction of sex." Again, the inquiry related only to free inhabitants, which of itself would invalidate all comparisons.

Now, the data in the table on page 488 for the last four censuses are the data for occupation statistics; they contain the well-known percentages which I have quoted above—namely, 13.0, 16.6, 18.1, and 18.5. Yet they also contain the startling data showing that in 1860 the proportion of women in "mechanical and manufacturing pursuits" was 20.65 per cent., and in 1850 even 23.65 per cent.; in other words, that during those twenty years the proportion of women in these occupations was decreasing, and that very rapidly.

Where, then, has Miss Abbott obtained these data, the existence of which the census denies? A search through the volumes of the *Twelfth Census* reveals the following: The data quoted for 1850 and 1860 are not occupation statistics at all; they do not show the number employed in "manufacturing and mechanical industries," but instead are the figures of the censuses of manufactures and show the "average number of wage-workers as reported by the manufacturers."<sup>1</sup>

Anyone familiar with the publications of the Census Office knows that in regard to this "average number of wage-workers employed in the manufactures" the methods used by the various censuses have been so different as to make any comparison very difficult and unreliable. But to compare the data of the statistics of *manufactures* of those two early censuses with the *occupations* statistics of the later four censuses, without even stating the unusual method used, is certainly a very hazardous undertaking; and it is not surprising that by means of such methods very novel results have been obtained.

The problem involved is of such importance that one is justified in going into detailed criticism of this risky statistical method and the fallacies consequent thereto; and I take the liberty to ask the interested reader to keep that table before his eyes in following my argument. According to the occupation statistics of 1870, the number of people in mechanical and manufacturing pursuits

<sup>1</sup> See the *Twelfth Census*, Vol. VII, p. xlvi.

was 2,701,421, while the number reported in the statistics of manufactures was 2,053,996; for the year 1880 the numbers are respectively 3,784,726 and 2,732,595; in 1890, 5,677,468 and 4,251,613; and finally in 1900, 7,085,329 and 5,316,802. This is sufficient evidence how incomparable the data are.

Nevertheless, the question may be asked: Granted that the totals obtained by these two methods are very unlike, what reason is there to think that distribution between the sexes is affected thereby? And if the sex distribution be not specifically affected, may not the data still be compared for that particular problem of sex distribution?

In the data for manufactures in 1850 and 1860 the wage-workers are divided into men, women, and children, the sex of the latter not being indicated, so that a comparison is made difficult. Nevertheless, the following startling comparison may be obtained by means of a simple calculation:

	PERCENTAGE OF WOMEN EMPLOYED		PERCENTAGE OF CHILDREN EMPLOYED ACCORDING TO STATISTICS OF MANUFACTURES
	According to Occupation Statistics	According to Manufacture Statistics	
1870 . . . . .	13.0	15.8	5.6
1880 . . . . .	16.6	19.1	6.7
1890 . . . . .	18.2	18.9	2.9
1900 . . . . .	18.5	20.0	3.2

It is seen, then, that in the statistics of manufactures the proportion of working-women is invariably greater than that shown in the statistics of occupations. It is also necessary to point out that in the second column the girls have not been taken into consideration, their number not being known; but adding them to the proportion of women would evidently further increase the difference.

Now, the main reason for this discrepancy is undoubtedly the fact, entirely overlooked by Miss Abbott, that the statistics of occupations include *building trades* and *miners* under "mechanical and manufacturing pursuits," while the data of the statistics of manufactures do not, and these two groups do not contain any women. Their inclusion in one case and their exclusion in the other case will make a very great difference in the percentage of women. But there are also other reasons to think that the statistics of occupations are much more dependable for the problem under discussion, for no

census of manufactures can possibly be complete. Only in the latest census have the small industrial establishments been carefully canvassed; and it is a well-recognized fact that as we go back the number of small establishments existing, and especially the proportion of those omitted, is rapidly increasing.

The small industrial establishments employing no hired labor, or perhaps one or two hands, must have been very numerous in the first half of the past century, and these establishments very rarely employed female labor. The omission of these has unduly exaggerated the proportion of women employed.

That these are not mere assumptions is shown by the very table which we are criticizing. But, unfortunately, Miss Abbott has overlooked these important facts; for, according to this table, the number of men employed in manufactures and mechanical pursuits has increased from 1,040,349 in 1860 to 2,353,471 in 1870, or proportionately to the male population over ten years of age from 90.25 per thousand in 1860 to 165.06 per thousand in 1870. Miss Abbott uses these comparative figures in her text, and makes a great deal of them; but, in comparing the figures for 1850 and 1900 (86 as against 194 per thousand, or an increase of 108 per thousand in fifty years), she does not notice that, according to her table, the greatest proportionate increase has taken place between 1860 and 1870, namely 75 per thousand; and therefore she is perfectly oblivious to the fact that this seeming sudden rise in American manufactures in the sixties, which no historian has previously noticed, is simply due to a sudden change of a statistical method.

It is only necessary to say that, according to the occupation statistics of 1850 and 1860 (which may be found in the volume on *Occupations of the Twelfth Census*), the number of workers employed in the building trades was: in 1850, 325,585, in 1860, 428,825,<sup>2</sup> and in 1870, 593,337; that these buildings trades are

<sup>2</sup> In 1850 the total number of male persons employed in manufacturing and mechanical pursuits was about 1,332,000, as an addition of all the items in Table V ("Occupations at the Twelfth Census") shows. The data reported for manufactures for that year show 731,137; and if to the latter figures be added 325,585 persons in the building trades, 82,290 miners, and 22,616 manufacturers—three classes not containing any women—we get a total of 1,161,628 men, as against 225,922 women. Even presuming the census of manufactures to be correct as far as all the other industries are concerned, the proportion of women is only 16.3 per cent. instead of 23.6 per cent. The same calculation for 1860 shows 428,825 men in the building trades, 158,157 miners, and 22,750 manufacturers,

included in the statistics of 1870, and not included in the data of the preceding two decades by Miss Abbott; that in 1870 the number of women employed in the building trades was exactly 2,660; that the miners are also excluded in 1850 and 1860, and included in the following years; and, finally that, even manufacturers are included in 1870-1900, and not before (and the number of manufacturers in 1900 was 243,000, with only 3,360 women)—to see what little foundation there is for the supposition made by Miss Abbott that 1870 represents a “point of depression” in the employment of women, and how hasty she is in condemning the census for choosing this “point of depression” as a basis of comparisons with recent years. This “point of depression” is purely illusory, and caused by an effort to make a comparison beyond the point of existing data—an effort which the census very properly refused to make.

This illusion has had a very deep effect upon the entire work of Miss Abbott. In many tables the proportion of women in various separate industries is studied, and everywhere the same mysterious point of depression is found. The persistency of this phenomenon should have aroused the suspicions of the investigator, as everywhere this “point” coincided with the radical change of method; instead, it seems to have strengthened the conviction that an important discovery has been made. The real reason for this seems to have been a misunderstanding of the word “census,” which includes many different sources of information. Various fragmentary sources have been used for conditions before 1850, but since 1850 and until 1900 federal census statistics have been used (see footnote 96), and therefore the unwarranted conclusion that figures for 1850-1900 are of necessity comparable.

In the study of individual industries the absence of the building trades and miners in the data of 1850 and 1860 could not, naturally, be felt. The more interesting is the evidence that, even were it not for these important omissions, the data for manufactures and of occupations are not comparable. It is not necessary to go into a very exhaustive analysis of all the faulty statistics quoted. Moreover, in a few industries, as in the cotton industry, the observation as to a decrease of the proportion of women is undoubtedly correct, though the faulty data used by Miss Abbott greatly exaggerate it. But which added to the total of 1,311,246 gives a grand total of 1,921,978; and the proportion of women drops down 14.1 per cent. instead of 20.6 per cent. While much lower than the percentages obtained by Miss Abbott, and undoubtedly nearer the truth, they are still arbitrary and of little scientific worth.

in the cotton industry there is no point of depression in 1870; there is instead a continuous decrease from 1850 to 1900 (table p. 484).

Only one set of figures will be analyzed—where the “point of depression” is greatest, and where, as a matter of fact, the fallacies committed are most palpable; that is, the “boots and shoes industry.” The proportion of women in that industry is claimed to be:

YEAR	PERCENTAGE OF WOMEN
1831	50.4
1837	39.3
1845	40.7
1850	31.3
1860	23.1
1870	5.6
1880	10.8
1890	15.7
1900	18.9

Truly a most surprising column, which would baffle the most learned student of American economic history. The very inspection of these figures should be evidence conclusive of their untrustworthiness; and the fallacy here is an economic and historic no less than a statistical one.

Does Miss Abbott suppose that seventy-five years ago half of our shoemakers were women? Who has ever seen a woman cobbler? Yet seventy-five years ago the manufacture of shoes as a large industry was in its infancy. It is explained in footnotes that the data for 1831 are for Lynn alone, and the data for 1837 and 1845 for Massachusetts alone—a shoe-manufacturing state. The rest of the data are for the entire United States. But there again the data for 1850 and 1860 pertain to the manufactures of boots and shoes, while for the years 1870–1900 the data are for the occupational class, “boot- and shoemakers and repairers,” which includes all the cobblers. Is it necessary to point out how misleading such a comparison is?

If Miss Abbott wanted to trace the changes in the proportion of women in the industry “boot and shoes, factory product,” she could have done so; but she should have used the data of the statistics of manufactures for all the later years as well, and not have reverted to the occupation statistics. She would then have seen that in 1880 the proportion of women in that industry was 22.6 per cent.; in 1890, 29.8 per cent.; in 1900, 33.7 per cent.—and that not

including the girls below sixteen years of age—and not 10.8, 15.7, and 18.9 per cent., as appears from the occupational statistics. And the cause of this difference is easily understood, if one but glances at the data for the industry "boot and shoes, custom work and repairing," where the women constituted in 1880 only 3.6 per cent. (824 out of 22,667); in 1890, 2.4 per cent. (405 out of 16,991); and in 1900, 1.3 per cent. (126 out of 9,698). Yet in the occupation statistics both these groups are thrown together; and those are the figures which Miss Abbott compares with the factory data of 1850 and 1860!<sup>3</sup>

The whole argument represents a most interesting combination of statistical fallacies, which a professional statistician enjoys to unravel. Still, this prolonged criticism would hardly be worth while, if not for the fact that Miss Abbott's studies on the problem of employment of women are among the most painstaking private investigations and are attracting considerable attention. The fallacies committed by her, therefore, threaten to lead to such widespread erroneous popular conceptions that early refutation becomes a duty, more especially since the article in question is stated to be "part of a larger history of women's work and wages in this country." The reappearance of these serious fallacies in the book would be regrettable indeed.

I. M. RUBINOW

BUREAU OF STATISTICS

U. S. Department of Agriculture  
WASHINGTON, D. C.

<sup>3</sup> According to the statistics of occupations there were employed in 1900, 163,393 men and 39,519 women in "shoe-making and repairing. According to the census of manufacture there were in all the four industries corresponding to the same group, 96,978 men, 50,608 women, and 4,740 children in all branches of the shoe and boot industry. The smaller number of men may be explained by the failure of the census of manufactures to include all the cobblers, though the census of 1900 made greater efforts than any other census to include the hand trades. But how may one explain that the census of manufactures shows 11,000 more women than the census of occupations? May not one advance the hypothesis that shoe-making was one of the industries of which women are ashamed, and which they therefore tried to deny in the answers to the census enumerators?